PANTYLUS CORDATUS COPE

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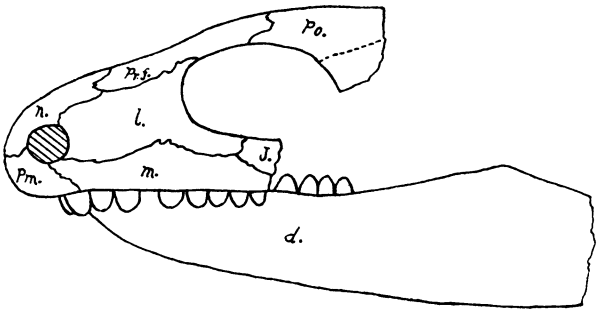
E. C. Case, in his recently published revision of the Cotylosauria of North America, has given to the genus *Pantylus* Cope the rank of a suborder, the Pantylosauria. Nothing is known of the genus aside from the skull and even that is more or less incomplete in the two hitherto known specimens. *Pantylus* is peculiar in so many respects that any new facts concerning it are of interest. It is for this reason that the writer here describes another specimen which, though incomplete, adds some additional facts of importance especially as regards the dentition.

The specimen herein described was collected by Mr. P. C. Miller, of the University of Chicago expedition of 1908, from the Lower or Wichita division of the Red Beds of Baylor County, Texas, near the Big Wichita River. It consists of the anterior part of the cranium, as in the type, the anterior part of the left mandibular ramus, and a nearly complete right ramus. Unfortunately the posterior part of the skull is missing, but it is fairly complete from a point a short distance back of the posterior border of the orbits to the muzzle. A little of the posterior end of the right ramus is missing, but nearly the entire length is represented and the dentition is complete.

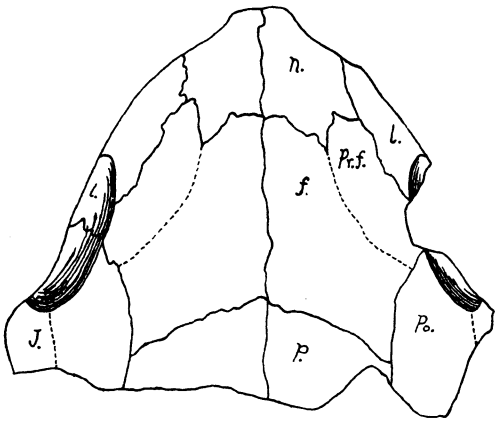
As shown in the appended table of comparison, the specimen is somewhat larger than the type. Although the posterior part of the skull is missing, its width must have been greater than the type, for the spread of the mandibular rami is at least 92 mm. Fig. 1*b* shows the anterior part of the cranium with most of the sutures indicated. Those between the premaxillaries, maxillaries, lachrymals, nasals, and parietals are distinct.

There is no trace of the sutures between the postfrontals and the prefrontals. In fact, there are but slight traces of the suture between the frontals and prefrontals, and this suture, with that

between the jugal and postorbital, is for this reason indicated by dotted lines. A comparison with Cope's figure[1] will bring out a few differences. The maxillary bone is here shown as taking part



1a



1b

FIG. 1.—*Pantylus cordatus* Cope. 1*a*, side view of skull with jaw attached. 1*b*, top of skull showing sutures. Figures natural size.

in the orbit. As indicated in Fig. 1*a*, the maxillary enters slightly into the external nares, but is excluded from the orbit by the lachrymal and jugal which unite in the inferior border of the orbit about

[1] *Trans. Am. Phil. Soc.*, XVII (1892) 25, Pl. 1, Fig. 4.

midway. This is essentially as Case has figured it.[1] The lachrymal extends back from the nares in a broad triangle and forms the entire anterior border of the orbit. It forms the floor of the front half of the eye cavity and extends inward nearly to the nares.

The arrangement of the palate bones, so far as one can make it out, is much the same as that in *Captorhinus*. The premaxillary is probably short and does not enter very largely into the internal nares. The prevomers are rather broad and well developed. They lie along the inner side of, and extend nearly to the posterior border of, the nares. The pterygoids, of which the posterior end is missing on both sides, send forward rather broad processes that converge in a gentle curve and meet at a point a little back of the posterior border of the orbits. From this point they extend forward, gradually narrowing and separating the prevomers fully half their length. In cross-section the pterygoids are angular, one side lying in the plane of the palate, the other extending vertically nearly to the cranial roof. Back of the nares and forming their posterior border lie the broad, platelike palatines. They extend inward toward the median line, underlying the pterygoids and extending upward along the inner angle of these bones. The transverse bones, if present, are indistinguishable.

Dentition.—While the upper dentition is probably not complete in this specimen, the essential features are readily made out. The premaxillary bears two teeth, the first of which is the larger, 4 mm. or more in diameter. The maxillary bears eight teeth and probably about four more of the posterior ones are broken away. The first two of these exceed those following in diameter and height, the second being the larger of the two and measuring but little less than the first premaxillary tooth. The remaining maxillary teeth are slightly oval in cross-section rather than circular and are sub-equal in diameter and height, these measurements being about 2 mm. and 2.5 mm. respectively. The prevomer region of the palate was exposed from above as the matrix below was very hard and was protected by the anterior part of the mandible. Hence it cannot be said with certainty whether the prevomers bear teeth or not, but in all probability they do. On each palatine there is a large,

[1] *Publication No. 145*, Carnegie Institution of Washington, p. 114, Fig. 52*c*.

rather well-defined pad of teeth, which in shape and size corresponds to a similar pad on the splenial. Measurements show that these two pads are exactly opposed posteriorly. Anteriorly, however, the lower pad apparently underlies the posterior part of the narial opening. The teeth of the palate group vary considerably in size and basal cross-section, apparently with no definite arrangement as to height or diameter. Most of the larger teeth, however, are disposed anteriorly although some of the smallest crowd closely on the posterior border of the nares. These palatine teeth are the same shortly conic, obtuse form as those of the lower dentition. They vary from 1.5 mm. to 3 mm. in height and from 1 mm. to 4 mm. in diameter. On the palatines one is able to make out about twenty teeth. The pterygoids are studded with irregularly placed, small, conical teeth, some fourteen of which are shown in the figure. These vary somewhat in size, though all are small, some being little more than mere points. Apparently all are hollow as are the other teeth.

Mandible.—The nature of the lower jaw is given by E. C. Case in his revision of the Cotylosauria (p. 114). Fig. 2*b* shows a cross-section of the right ramus at the third tooth from the last in the dentary series. The suture above separating the dentary and the splenial is readily made out, as is that intersecting the broad lower surface of the ramus. It is the upper, inner element of the mandible that bears the pad of teeth referred to above. Clearly this is the splenial. Besides these sutures which are easily seen, it is possible that two other elements are shown as indicated by the dotted lines; one with an angular cross-section on the lower, inferior angle of the ramus, and a thin platelike one on the inferior surface. Immediately above the dentary, within the central cavity, lies a thin plate of bone that is apparently no part of the dentary or the element joining it. The central cavity is confluent with the large orifice immediately posterior to the splenial group of teeth, as shown in Fig. 2*a*. From the dentary foramen a well-marked suture runs up and forward to the inner, anterior margin of the Meckelian orifice. Further than this, one is unable to make out the sutures with any degree of certainty. Like the other dimensions of the specimen, those of the lower jaw are greater than in the type specimen as shown in the table.

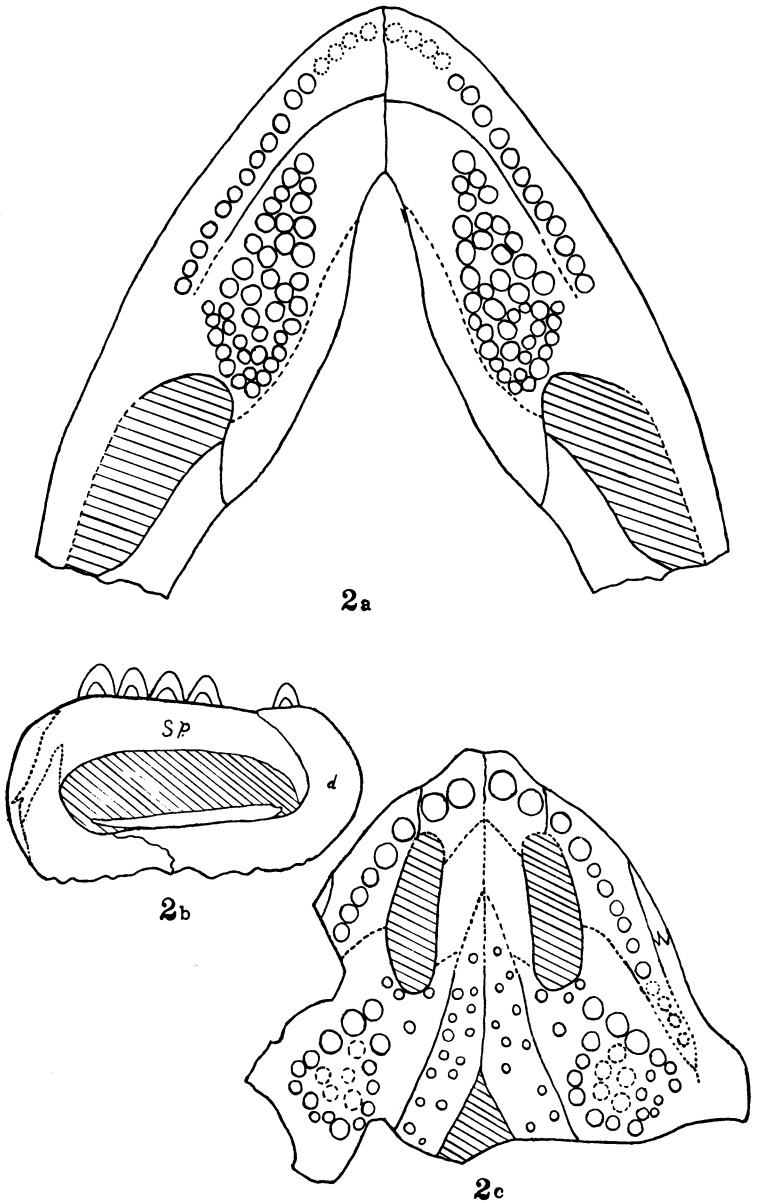


FIG 2.—*Pantylus cordatus* Cope. *2a*, lower jaw showing dentition. Natural size. *2b*, cross-section of right ramus at the third tooth from the last in the dentary series. Figure twice natural size. *2c*, palate view showing dentition. Natural size.

The greatest interest of the specimen probably lies in its mandibular dentition. Beyond a doubt the larger number of teeth are on the splenial bone instead of the dentary. Unfortunately the crowns of most of the teeth of the mandible were destroyed in the separation of the rami of the skull. One is able nevertheless to make out the arrangement of all the teeth except for a short distance on the anterior border. This space is well beyond the termination of a regular, definitely outlined inner pad of teeth, however, and most likely only the outer row is continued forward. Judging from the size of the teeth exposed in the outer row, there are four teeth hidden in this anterior part of each ramus by the matrix of the projecting muzzle. As suggested above, the teeth are arranged in two groups, an outer row of sixteen teeth, the posterior twelve of which are shown, and an inner pad or series. In the outer row they apparently do not vary greatly in cross-section. As to any variation in height of crown I am unable to say. This series, I am confident, comprises the only teeth on the dentary. The inner series is arranged in a pattern of regular shape. The outline of this pattern is formed by a band of twenty-five teeth which become progressively smaller posteriorly from nearly 3 mm. in cross-section at the anterior border to 1.5 mm. at the posterior side. Within this peripheral band are fifteen irregularly disposed teeth. In cross-section these range from 4 mm. to 2 mm., the larger being disposed anteriorly. It is impossible to determine the height of the crowns of this inner series but it is certain that some of them were higher than the regularly placed peripheral group. It is interesting to note that while the teeth of the inner series show a circular section midway between the base and the apex, the base often shows a polygonal cross-section and here only small interspaces are left between the teeth.

In Cope's description of *P. coicodus*, the second species of this genus, the chief distinguishing features are found in the teeth. They have a pointed apex like the grass seed *Coix lachroma*, while those of *P. cordatus* are obtuse. *P. coicodus* also has "partially pleurodont" teeth with a swollen crown on a shanklike base. Case suggests that the obtuse tooth of *P. cordatus* is simply that of *P. coicodus* with the pointed apex worn down and that the two species

are not distinct. In the specimen here described the teeth do not appear to be greatly worn and they probably never had the pointed apex. The shanklike base is also wanting and the teeth are distinctly acrodont. For these reasons I believe that *P. coicodus* and *P. cordatus* are distinct species. And, furthermore, if Cope was correct in his statement that *P. coicodus* has a partially pleurodont dentition, the differences seem to be greater than specific.

The dentition would suggest peculiar food habits for the animal. The lack of sharp teeth certainly indicates that its food did not require cutting. In all probability the dental armature was an adaptation for the crushing of shells of gastropods and other molluscs.

A COMPARISON OF MEASUREMENTS

	Type Specimen	Described Specimen
Length of axis of cranium to line connecting anterior border of orbits	0.018 m.	0.020 m.
Inter-orbital width	0.032	0.040
Longitudinal diameter of orbits	0.016	0.021
Length from orbit to nostril	0.015	0.018
Height of crown of large maxillary tooth	0.0045	0.003
Width of mandibular ramus below at middle	0.020	0.027
Length of part of ramus preserved	.....	0.084
Spread of rami at greatest length	.....	0.092
Width of cranium at line connecting posterior border of quadrates	0.077	.....